Ontario's Nutrient Management Program

September 15, 2021

Presentation Overview

1. Background and Overview of the Regulatory Program

2. Generation of Nutrients (Manure) on the Farm
   - Siting of Barns and Manure Storages
   - Construction Standards
   - Storage Requirements
   - Runoff Management

3. Application of Nutrients on Land
   - Nutrient Balancing and application rates
   - Setbacks from Sensitive Features

4. Minimum Distance Separation Formula
   - Required setbacks from neighbouring land uses

5. AgriSuite Demo
   - Software that is available to complete Nutrient Management Strategies/Plans and MDS calculations

Objectives:

- Provide an overview of the Nutrient Management Program
- Provide a list of resources that can be used to find more details on the BMPs
- Allow time for questions and discussions on topics of interest

Background

- Nutrients are essential for **crop production** and for **healthy soils**. Responsible nutrient management allows for **improved productivity** while also **mitigating negative environmental impacts.**
- Nutrients and pathogens are inherent to certain aspects of agricultural production, and have the potential to **adversely effect human health and impair water quality, if managed incorrectly.**
- The Nutrient Management Act (NMA) was introduced in 2002 to **address environmental risks pertaining to the storage, transfer and land application** on farms (administered jointly by OMAFRA and MECP). The introduction of this legislation was partially in response to **recommendations from the Walkerton tragedy**.
- The General Regulation (O. Reg. 267/03) under the NMA came into force in 2003, to address livestock manure. Over time, the regulation has evolved to incorporate other prescribed materials (e.g. off-farm materials and greenhouse nutrient feedwater for land application)
- The NMA provides a **prescriptive regulatory framework for the beneficial agricultural use of certain materials** that are exempt from a site-specific Environmental Compliance Approval (ECA) under either the *Environmental Protection Act (EPA)* or *Ontario Water Resources Act (OWRA).*

Nutrient Management Act & Regulations

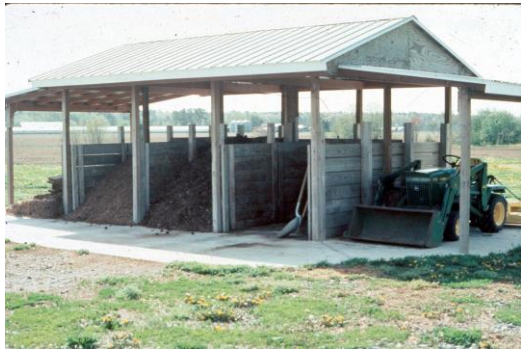
Nutrient Management Act 2002

O.Reg 267/03 -General

- Agricultural + Non Agricultural Source Material
- Regulated Mixed Anerobic Digestion Facilities
- Nutrient Management Protocol
- Nutrient Management Tables
- Sampling and Analysis Protocol

O.Reg 106/09 – Disposal of Dead Farm Animals

- Sets out requirements for disposal of dead farm animals on the farm
- Prescribed disposal options
- Provisions for emergency conditions & director authorization if disposal options cannot be met

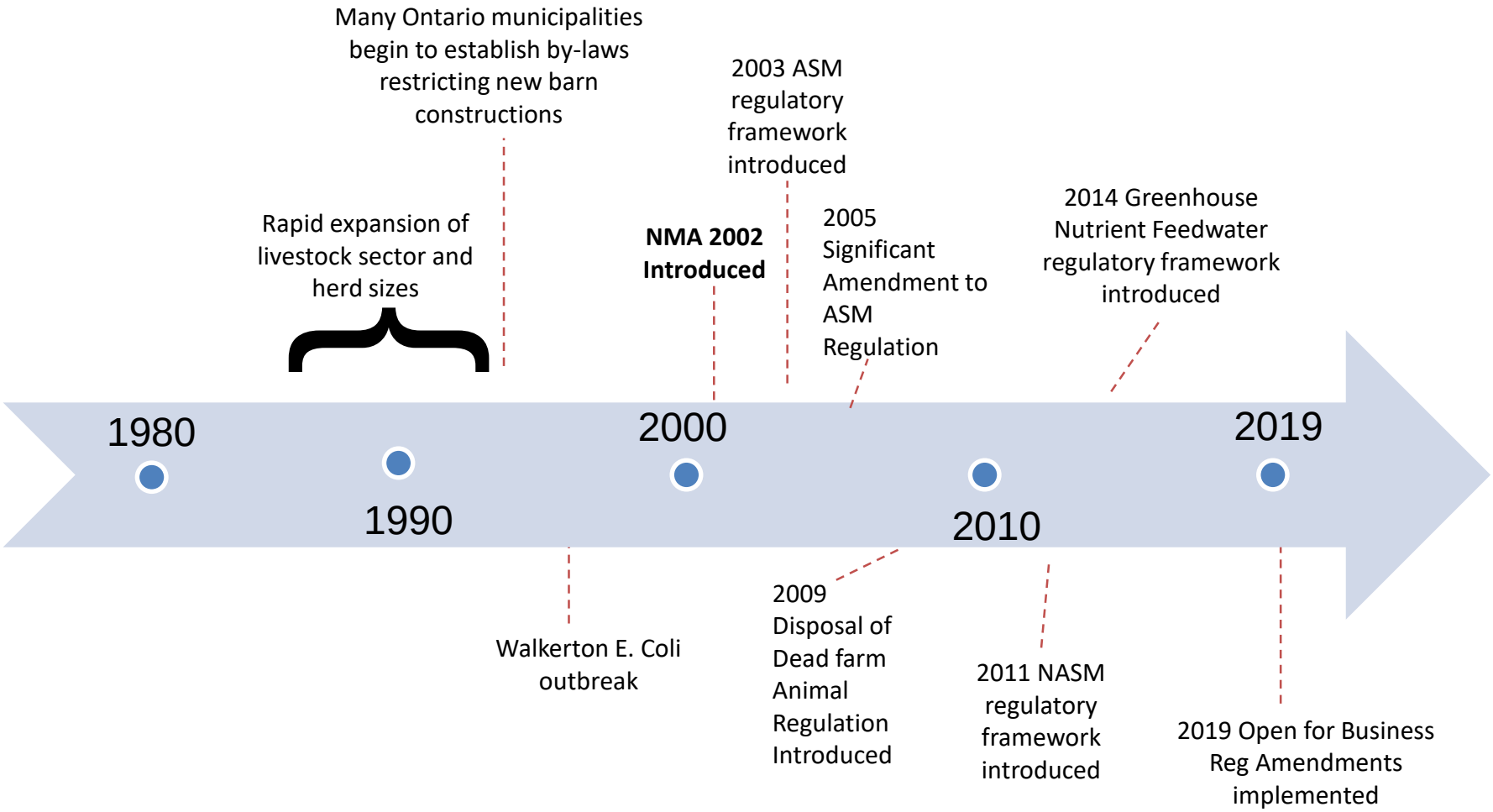


O.Reg 300/14 - Greenhouse Nutrient Feedwater

- Applies to the nutrient feedwater that is removed from a closed circulation system
- Provides an option to greenhouse operations to land apply the material to the benefit of another crop

Ontario

Nutrient Management Act & Regulation Timeline



ASM = Agricultural Source Material
NASM = Non-Agricultural Source Material
Appendix #1 provides a glossary of terms and acronyms

Nutrient Management Act, 2002: Overview

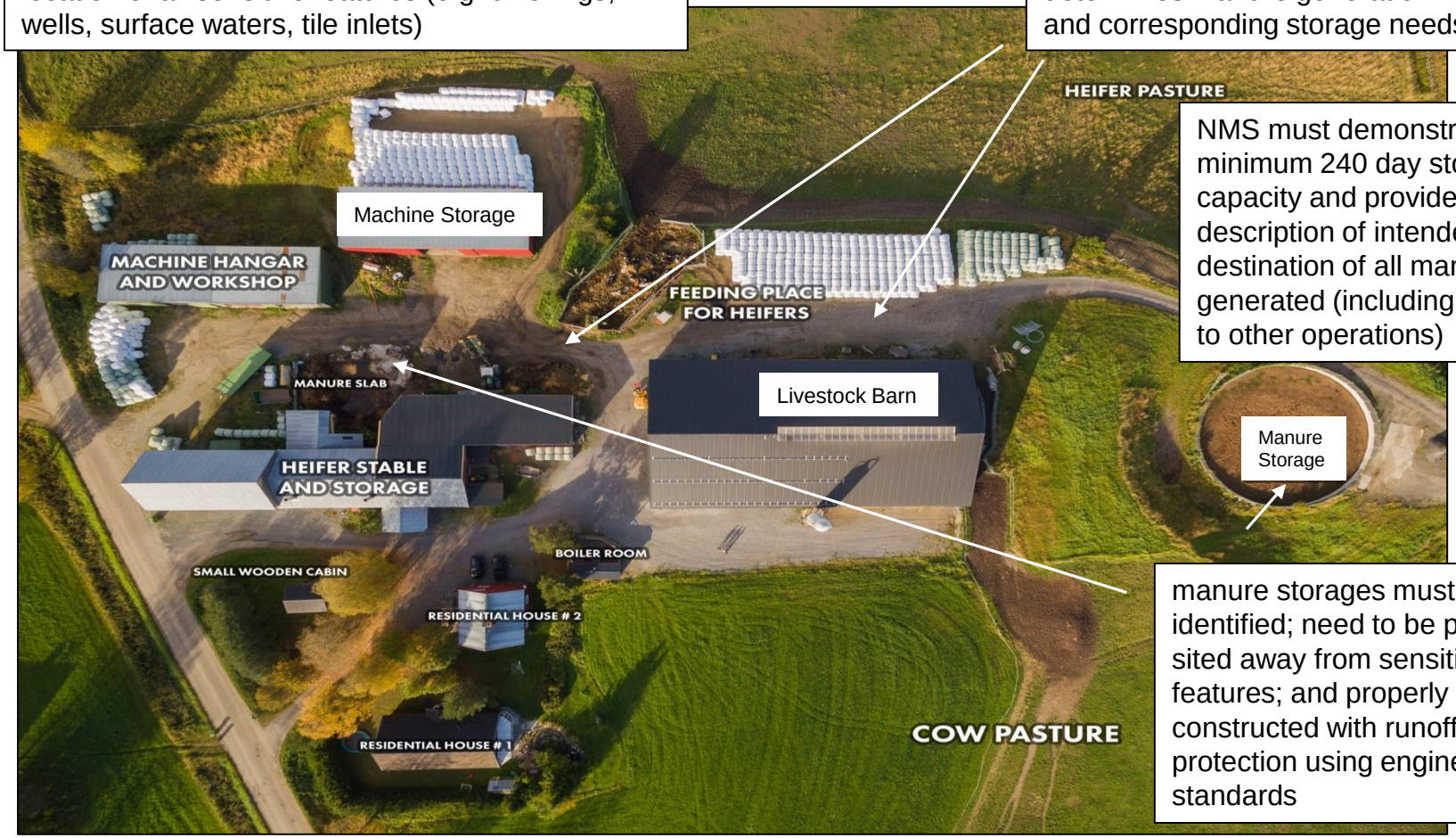
- The **purpose** of the *NMA* is to provide for the management of materials containing nutrients in ways that will enhance the protection of the natural environment **and** provide a sustainable future for agricultural operations and rural development.
    - Applicable to "*agricultural operations*"
    - Applicable to "*nutrients*" applied for the purpose of improving the growing of crops
    - Delineates differences between two key aspects of nutrient management – **"*nutrient management strategy* (NMS)"** and **"*nutrient management plan* (NMP)"**
        - A NMS is a plan to ensure Nutrients generated by the generator are appropriately managed (i.e. storage, capacity, utilization)
        - A NMP is a plan to ensure that Nutrients are appropriately applied to land
    - Regulations establish standards respecting: a) the management of Nutrients by agricultural operations; and b) farm practices to be followed with respect to Nutrients that must be complied with by farmers.

Nutrient Management Strategy (NMS)

- NMS required upon submission of a building permit for a structure to house animals or to store manure
- NMS must be approved by OMAFRA.
- Regulates the “point source pollution” aspects of the manure (focus on generation & storage)

farm unit must be identified with sketch showing location of all sensitive features (e.g. dwellings, wells, surface waters, tile inlets)

barn(s) livestock capacity (livestock #’s) determines manure generation volumes and corresponding storage needs



NMS must demonstrate minimum 240 day storage capacity and provide description of intended destination of all manure generated (including transfers to other operations)

manure storages must be identified; need to be properly sited away from sensitive features; and properly constructed with runoff/leakage protection using engineering standards

Managing Nutrients at the Farmstead

- Managing nutrients is about:
  - avoiding adverse effect
  - protecting water
  - keeping storages from breaching
  - preserving nutrients
  - minimizing input costs
  - containing nutrients and pathogens

The purpose of a nutrient management strategy (NMS) is to manage nutrients at the farmstead to avoid loss.

Siting – Areas of Risk and Sensitive Features

- When siting, consider potential risks such as proximity to:
  - surface water
  - subsurface, perforated or clay drainage tile
  - wells
  - tile inlets
  - floodplains
  - groundwater

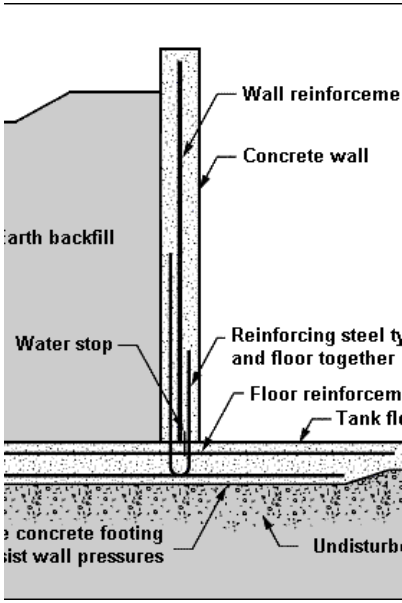
Calculating Size

- **Solid storage considerations**
  - Prescribed material volume
  - Bedding volume
  - Projected dry matter
- **Liquid storage considerations**
  - Prescribed material volume
  - Extra liquids such as wash water and precipitation
  - Safety factors
  - 1 foot of freeboard minimum
  - Residual materials
  - Unexpected weather events

Construction Standards

- Site Characterization study is required for all new or expanding liquid storages and some solid storages

- Engineering design required for all liquid storages and solid storages that are greater than 600m2/600m3 or have a wall height of >1m

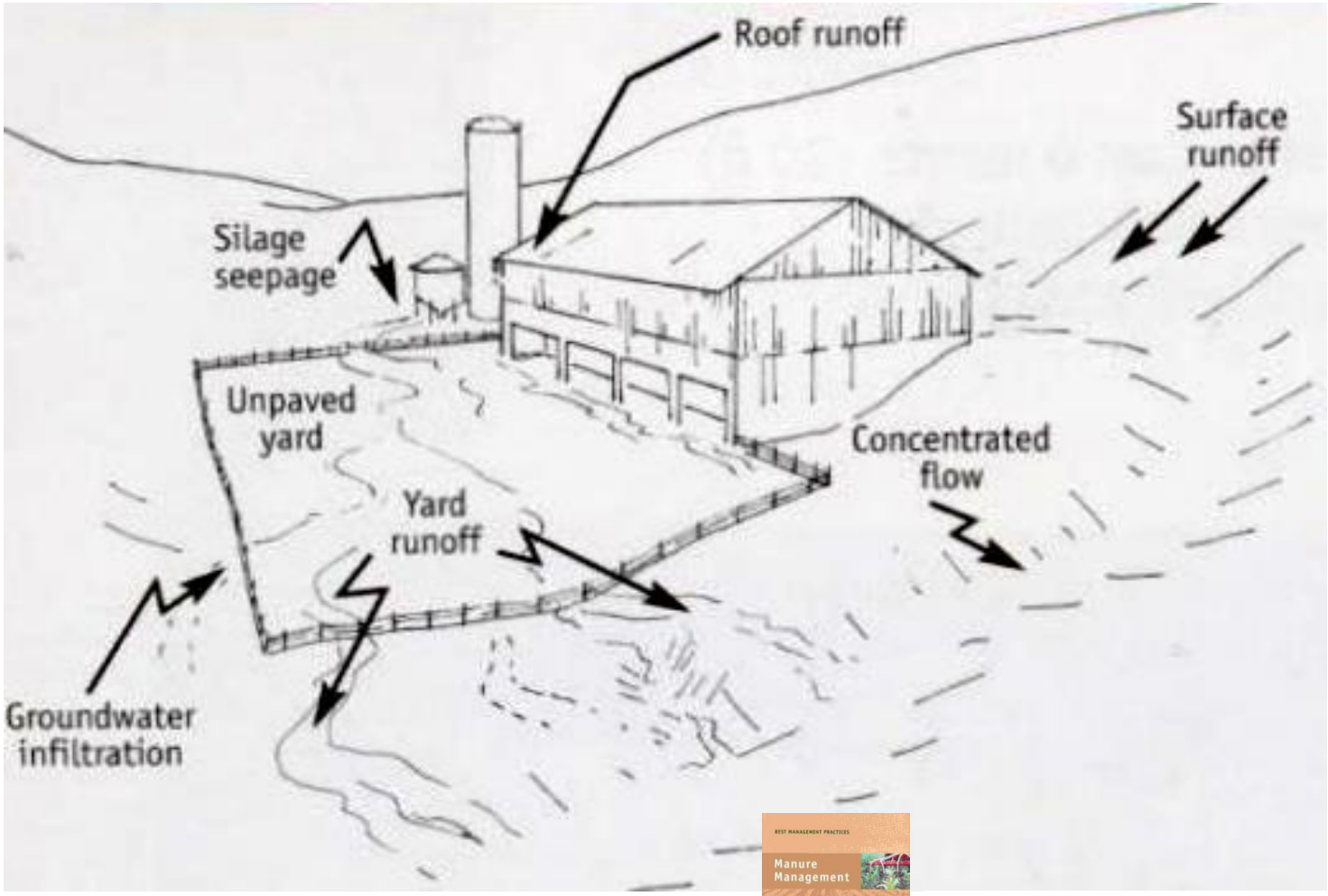


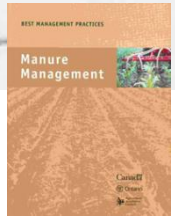
Storage Siting Requirements

Minimum setback distances for permanent storage sites.

Feature	NM Regulations (ASM)	BMP
Flow path to surface water & tile inlet	50 m	50 m
Municipal well	100 m	151 m
Drilled well	15 m	46 m
Any other well	30 m	46 m
Flood plain	with permit	never

Runoff Management





Manure Management
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Runoff Management Options

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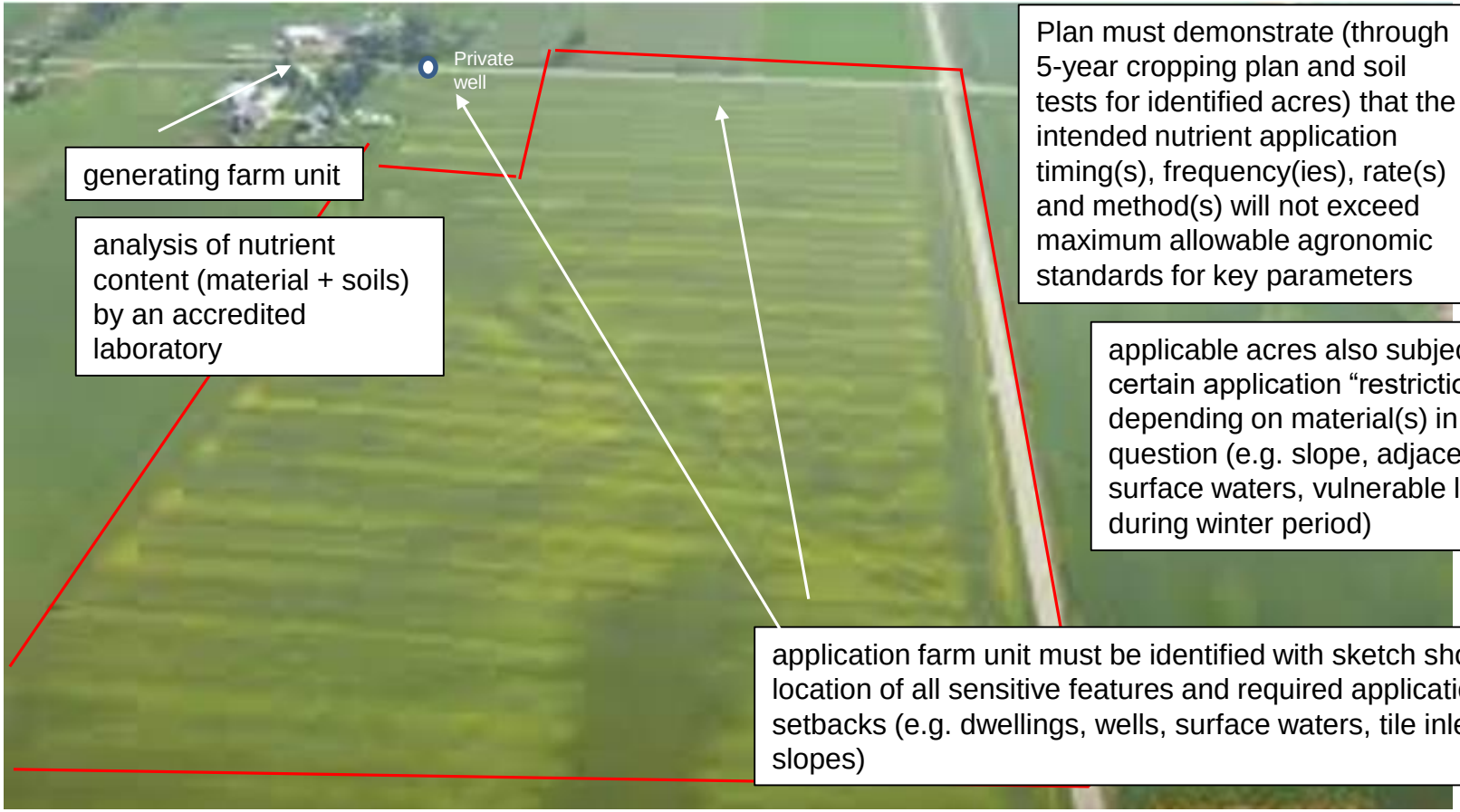
- Runoff management options:
  - minimize
  - eliminate
  - contain
  - treat to lessen nutrient/pathogen content

Objective of Applying Nutrients for the Growing of Crops

- Nutrients are valuable for crop production, but nutrient application may cause an adverse effect.
- NM planning organizes management considerations into a comprehensive document to minimize risk.
- Considerations include:
  - nutrients to be applied (type and amount)
  - field conditions
  - timing of application
  - soil fertility
  - site conditions

Nutrient Management Plan

- NMP generally only required on farms <u>generating</u> ≥ 300 NU per year.
- All Plans valid for up to 5 years. All Plans must be prepared by an OMAFRA-certified person.
- Regulates the "non-point source pollution" aspects of the prescribed materials (focus on application)



Managing Nutrients on the Field

- **Nutrient Management Plans (NMP):**
  - land application and management of ASM and commercial fertilizers
  - understanding field characteristics
  - determining application methods and rates to minimize harm and maximize benefit
  - minimizing environmental risk

Nutrient Sources

- Nutrients can be very valuable for crop production
- Different sources of nutrients = different nutrient composition

- Consider the nutrient sources below and when they would be the most valuable to use…

Manure

NASM

Anaerobic digester digestate

Commercial fertilizer and compost

Balanced Application Rate

Balancing the application rate of nutrient sources helps to:

- meet crop needs
- use available manure and/or NASM
- limit environmental impact
- not over-spend on commercial fertilizer

TOO MUCH = ↑ potential for runoff or leaching

too little = ↓ crop yield or quality

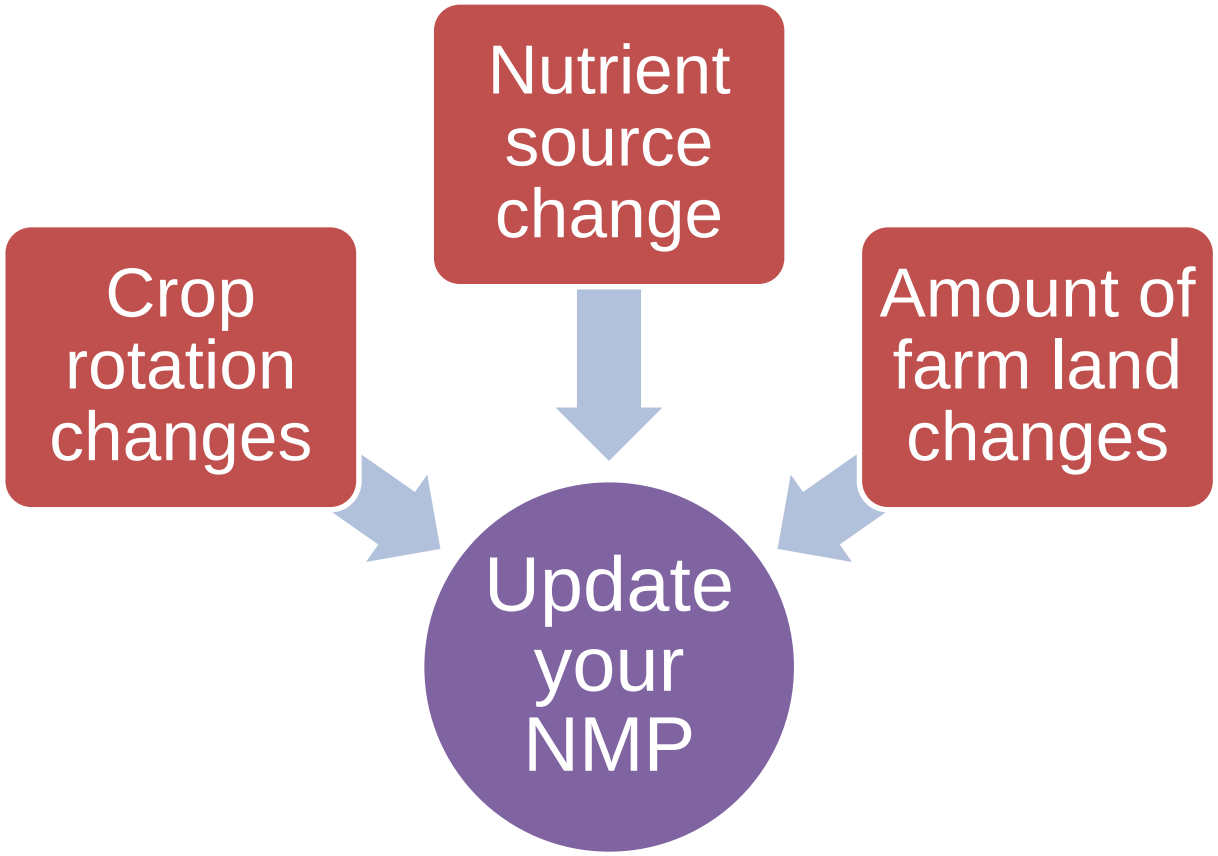
Why Manage Nutrients?

MAXIMIZE nutrient utilization

MINIMIZE input costs

MINIMIZE environmental risks

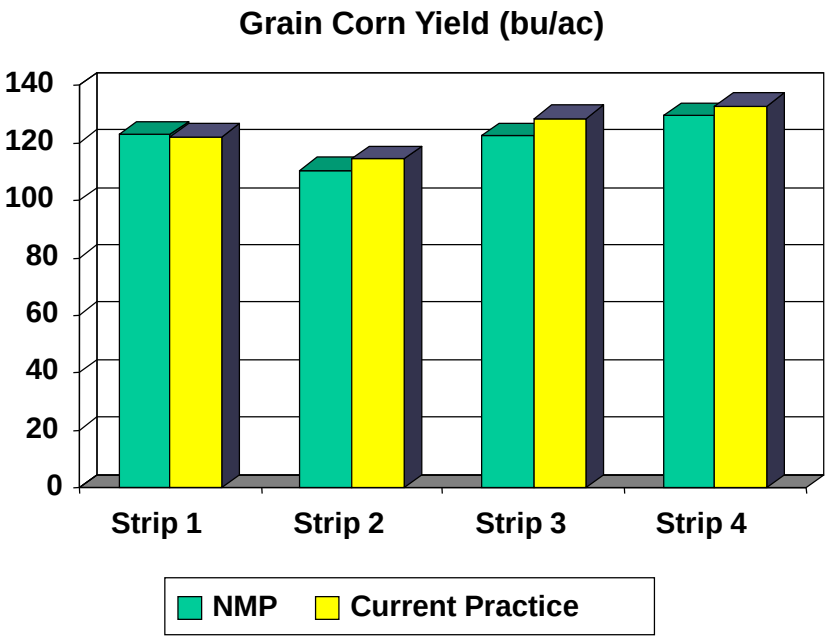
Challenges of Planning

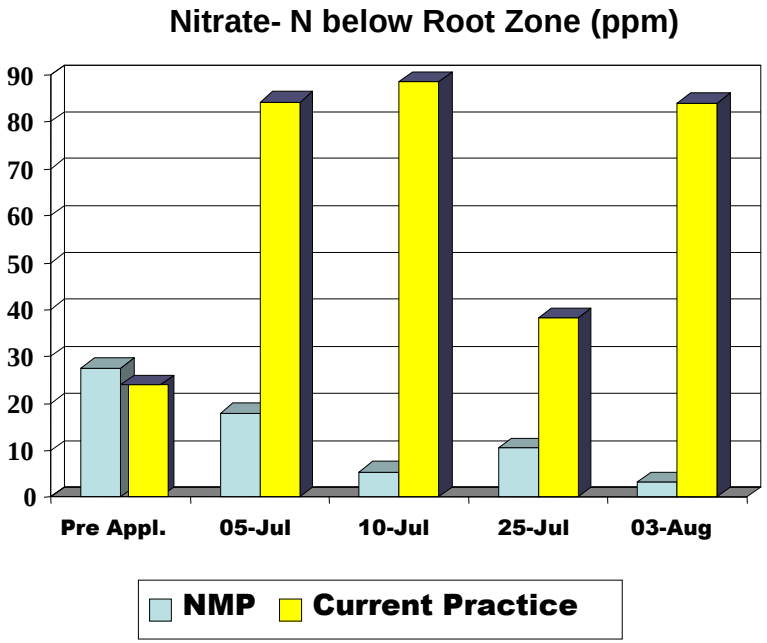


- Important to keep accurate records and update your NMP

Why Prepare an NMP/NASM Plan?

Example: Yield and Environmental Effects of Following Recommended N Rates





Source: PINUE Project - 2000 Waterloo County

Manure as a Resource

"I think it's really important to develop a nutrient management strategy and plan as soon as possible. There are still farmers out there who don't really know what to do with the manure they have. It's such a valuable product. You can use it all over your fields and it makes you money."

Antoon Romme, Norwich

"There's a lot of negativity about nutrient management plans. I think most of it has to do with people not understanding it. But once you understand the purpose of it, how it helps you manage manure better, and the safety for the environment - personally, I think it's good."

Erwin Horst, Perth County

Manure as a Resource

Liquid Hog Finishing Example

Available Nitrogen*	Available Phosphorus**	Potassium
33 lb/1000 gals	14 lb/1000 gals (50% of full value)	30 lb/1000gals
$17.92/1000 gals***	$9.17/1000gals**	$11.37/1000gals*
*** 46-0-0 UREA @ $550/tonne = ~$0.54/lb		
** 11-52-0 MAP @ $750/tonne = ~ $0.66/lb		
* 0-0-60 Potash @ $500.00/tonne = ~$0.38/lb		
(values are based on 2018 retail values)		

* Spring applied ** Value only given for the 50% available in year of application

Manure as a Resource

Liquid hog finishing manure

- 4500 imperial gallons/acre
- Applied in spring
- Same day incorporation

=

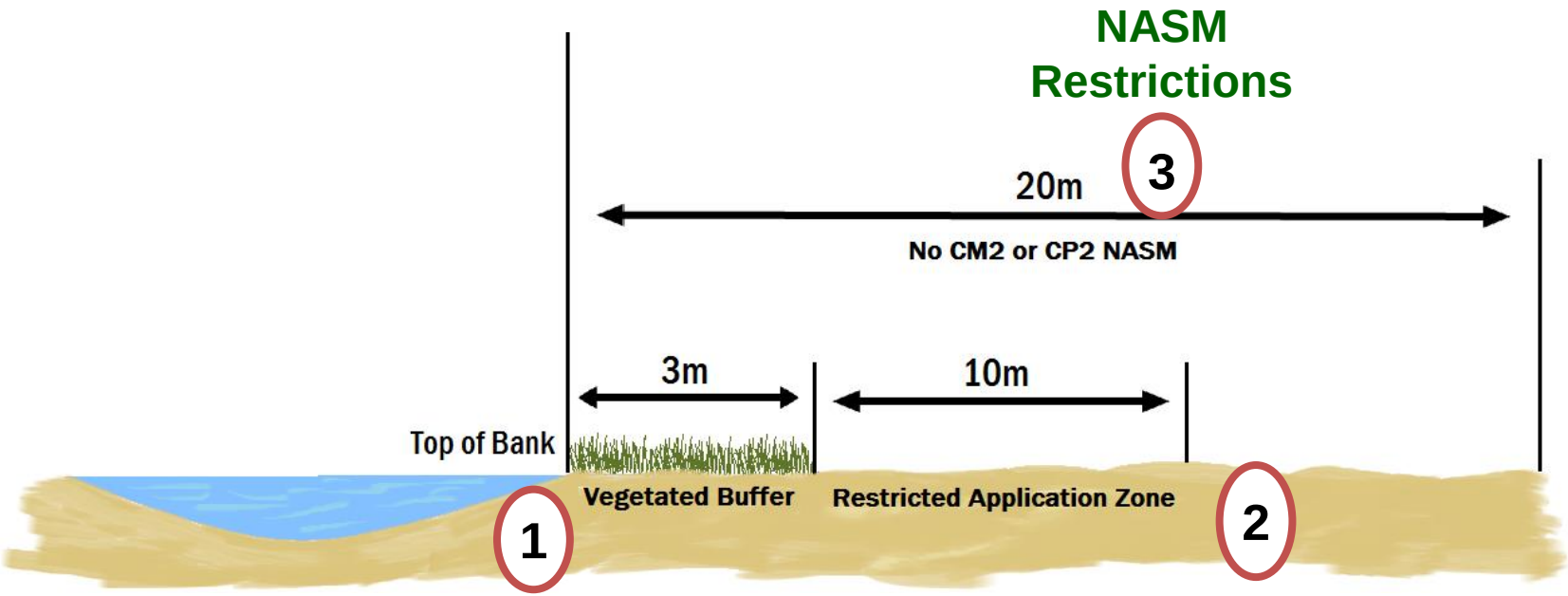
- 149 lbs - Nitrogen
- 63 lbs – Phosphorus (in year of application)
- 135 lbs - Potassium

Estimated commercial fertilizer replacement cost of **$173/acre**
(in year of application, total value over time is $214/acre)

Value of Manure

- Manure contribute to soil organic matter.
- Soil will:
  - retain water
  - retain nutrients
  - remain more stable to minimize runoff and erosion

Regulatory Setbacks from Surface Water



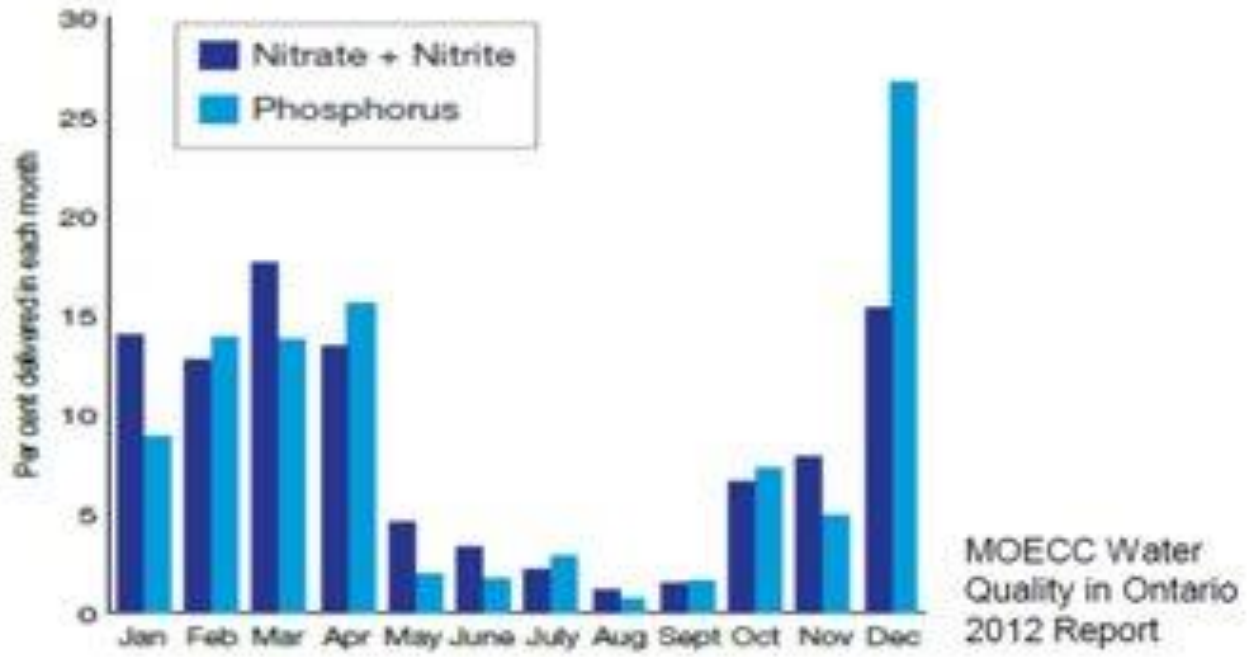
Setbacks from Wells

	Setbacks in metres for:				
Well Type	**Ag. Source Materials**	**Non-Ag. Source Materials (NASM)**			**Commercial Fertilizer/ Compost**
	NMA	**NMA CP1 & CM1**	**NMA CM2 or CP2**	**BMP**	**NMA**
Municipal	100	100	100	100	100
“Drilled”	15	15	15	15	3
Other	30	30	90	90	3

Timing of Application

- Why storage capacity and planning is important:

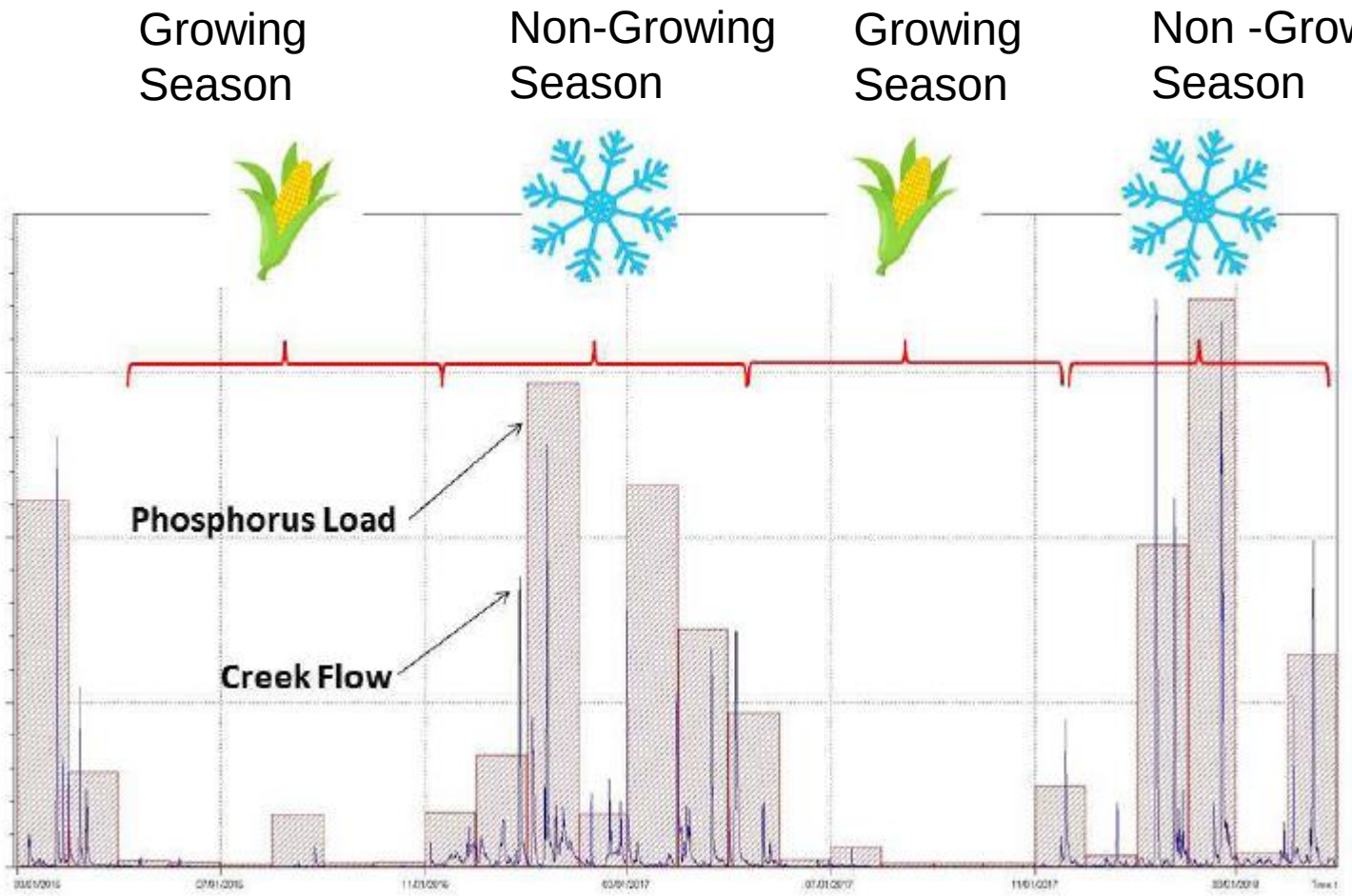
Majority of nutrient export in non-growing season:



MOECC Water Quality in Ontario 2012 Report

Looking at the creek flow and weather data a little bit more closely..

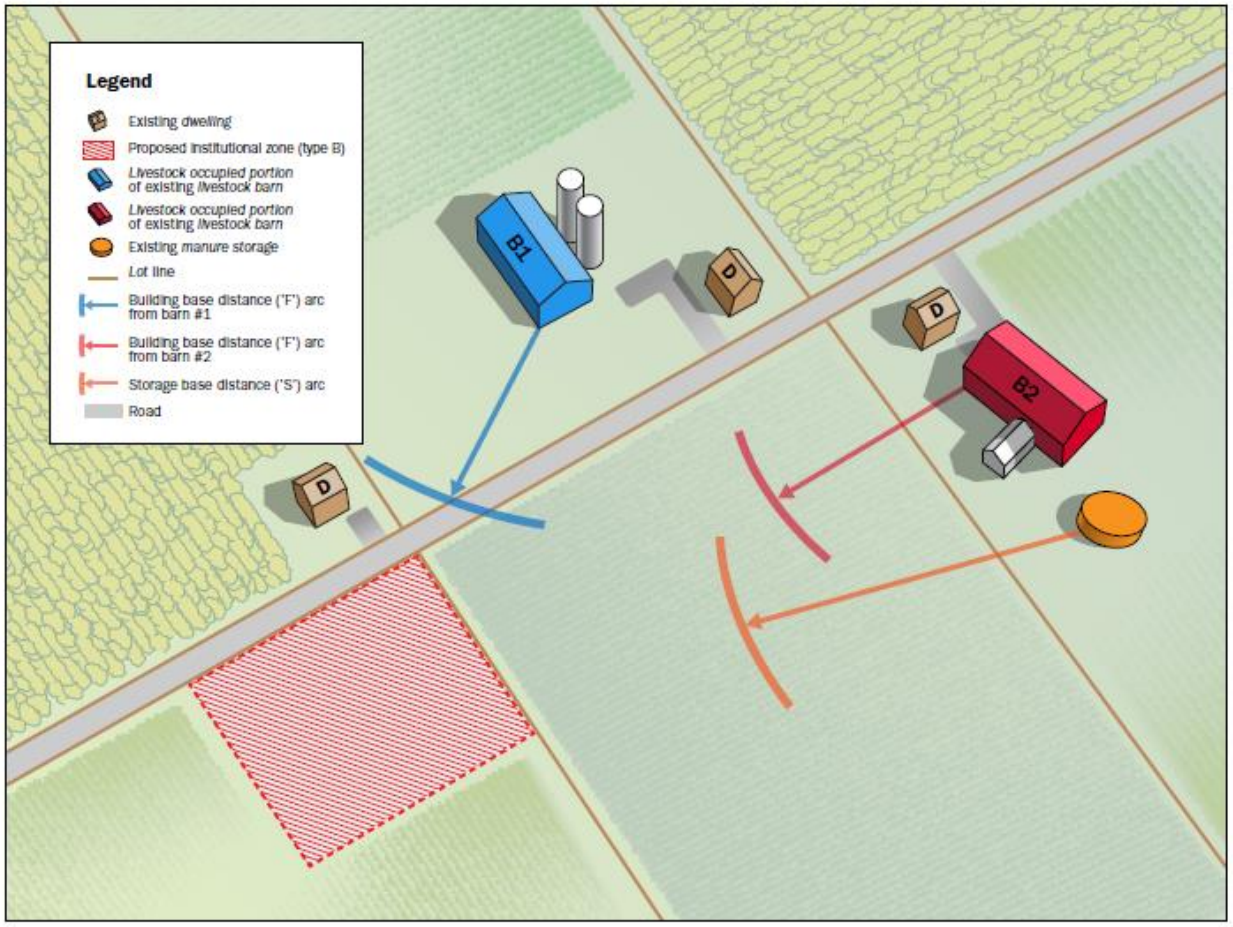
From Upper Medway Creek (credit Kevin McKague, OMAFRA)



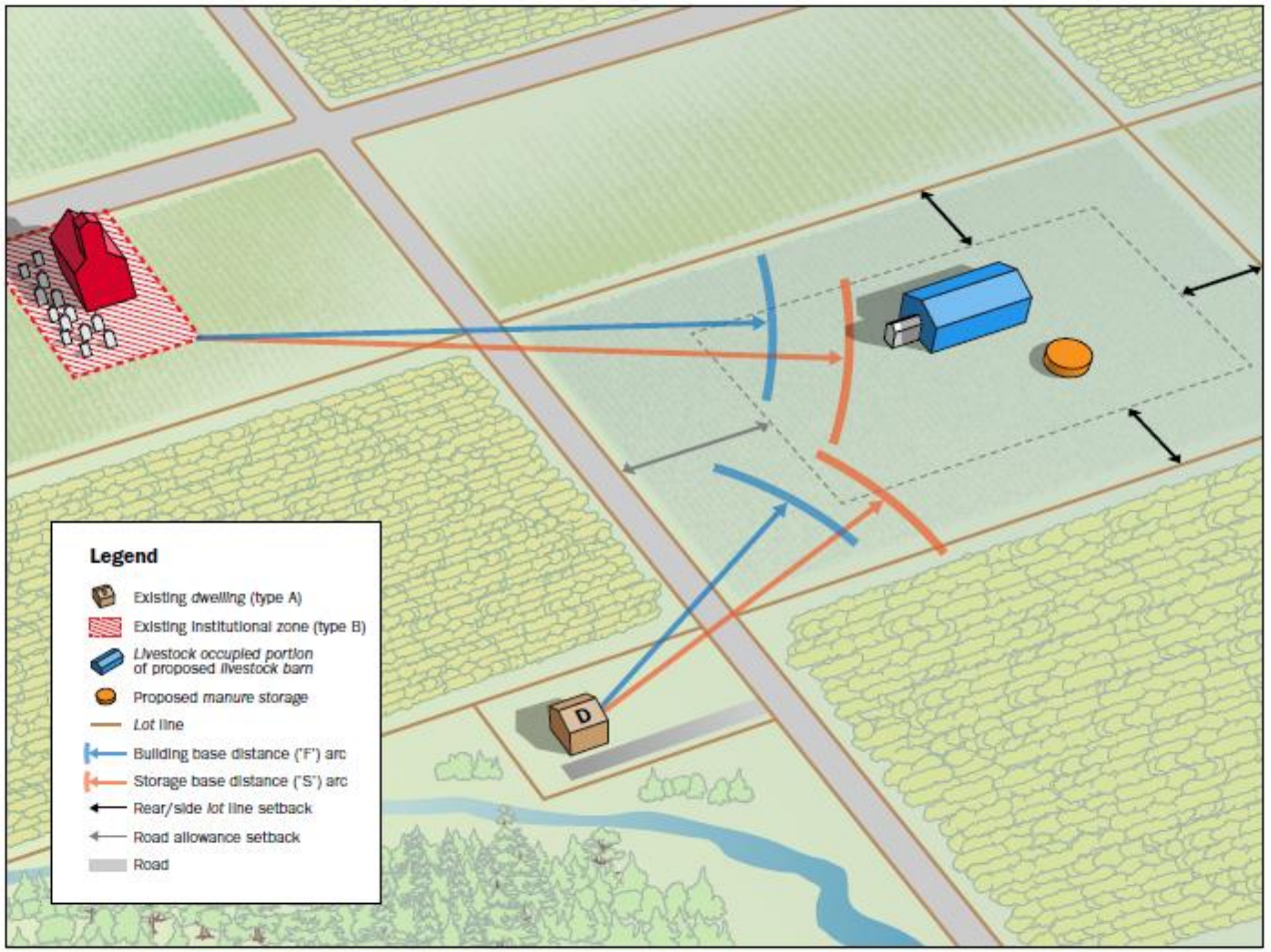
Minimum Distance Separation (MDS)

- The Minimum Distance Separation Formulae (MDS) is a land use planning tool developed by OMAFRA
- Determines a setback between livestock facilities and other land uses, and vice versa
- Separation distances vary according to a number of variables
- It is implemented through the land use planning system; and is identified in the Provincial Policy Statement (PPS)
  - In turn, MDS is incorporated into municipal land use planning documents

MDS I and a Proposed Re-Zoning



Measurement of MDS II



AgriSuite Demo

- Calculating Manure Storage Capacity
- Nutrient Balances
- MDS Calculations

Resources:

- **AgriSuite - https://agrisuite.omafra.gov.on.ca/**
- **Best Management Practices Series - http://www.omafra.gov.on.ca/english/environment/bmp/series.htm#16**
- **OMAFRA Website - http://www.omafra.gov.on.ca/english/agops/index.html**
- **NutrientManagement.ca - https://www.nutrientmanagement.ca/**
- **Environmental Farm Plan - http://www.omafra.gov.on.ca/english/environment/efp/efp.htm#workbook**